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Teachers' Retirement System
State of Montana

Actuarial Valuation
As of July 1, 2011

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September 22, 2011

Teachers' Retirement Board
State of Montana
1500 Sixth Avenue
Helena, MT 59620-0139

Members of the Board:

In this report are submitted the results of the annual valuation of the assets and liabilities of the Teachers' Retirement System of Montana (TRS), prepared as of July 1, 2011.

The purpose of this report is to provide a summary of the funded status of the System as of July 1, 2011 and to provide the Annual Required Contribution (ARC) for the fiscal year ending June 30, 2013. While not verifying the data at source, the actuary performed tests for consistency and reasonability. Contributions for TRS are established every two years. The actuarially calculated contribution rates based on the July 1, 2011 results presented in this report are for informational purposes only. The recommended employer contribution rates for the fiscal years ending June 30, 2012 and 2013 were determined as part of the July 1, 2010.

The promised benefits of the System are included in the actuarially calculated contribution rates which are developed using the Entry Age Normal cost method. Four-year market related value of assets is used for actuarial valuation purposes. Gains and losses are reflected in the unfunded accrued liability that is being amortized by regular annual contributions as a level percentage of payroll, on the assumption that payroll will increase by 4.50% annually. The assumptions recommended by the actuary and adopted by the Board are in the aggregate reasonably related to the experience under the Fund and to reasonable expectations of anticipated experience under the Fund and meet the parameters for the disclosures under GASB 25 and 27.

This is to certify that the independent consulting actuary is a member of the American Academy of Actuaries and has experience in performing valuations for public retirement systems, that the valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement system and on actuarial assumptions that are internally consistent and reasonably based on the actual experience of the System.

Future actuarial results may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

In our opinion, in order for the System to operate in an actuarially sound manner, contributions equal to the ARC are necessary for future fiscal years. Assuming that these contributions are made to the System, from year to year in the future at the rates recommended on the basis of the successive actuarial valuations, the continued sufficiency of the retirement fund to provide the benefits called for under the System may be safely anticipated.

The Table of Contents, which immediately follows, outlines the material contained in the report.

Respectfully submitted,

Edward A. Macdonald, ASA, FCA, MAAA
President

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EAM:TBG/kc

Teachers' Retirement System
State of Montana

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Section I

Summary of Findings

For convenience of reference, the principal results of the valuation and a comparison with the preceding year's results are summarized below:

(Dollar amounts in thousands)

VALUATION DATE	**July 1, 2011**	**July 1, 2010**
Active members		
Number		
Full-Time Members	12,506	12,711
Part-Time Members	5,978	6,242
Annual valuation compensation	$ 746,694	$ 747,037
Retired members and beneficiaries		
Number	12,899	12,440
Annual allowances	$ 250,500	$ 234,048
Inactive Members		
Vested Terminated Members	1,580	1,553
Non-Vested Terminated Members	10,727	10,304
Assets		
Actuarial value	$ 2,866,483	$ 2,956,583
Market value	2,972,419	2,521,446
Actuarial Accrued Liability (AAL)	$ 4,658,594	$ 4,518,168
Unfunded Actuarial Accrued Liability (UAAL)	$ 1,792,110	$ 1,561,585
Funded Ratio	61.53%	65.44%
Market Value Rate of Return	21.67%	12.87%

STATUTORY AND ANNUAL REQUIRED CONTRIBUTIONS*	**2013 Based on July 1, 2011 Valuation for Informational Purposes Only**	**2013**	**2012**
Total Normal Rate	9.64%	9.74%	9.74%
Employee Contribution Rate	7.15%	7.15%	7.15%
Employer Normal Rate	2.49%	2.59%	2.59%
Employer Statutory Contribution Rate			
Normal Rate	2.49%	2.59%	2.59%
UAAL Rate	7.47%	7.37%	7.37%
Total Rate	9.96%	9.96%	9.96%
Amortization Period	71	Infinite	49.5
Employer ARC under GASB			
Normal Rate	2.49%	2.59%	2.59%
UAAL Rate	11.00%	11.59%	9.57%
Total Rate	13.49%	14.18%	12.16%
Required Increase in Statutory Contribution Rate	3.53%	4.22%	2.20%
Amortization Period	30	30	30

* The July 1, 2011 valuation is for informational purposes only. The July 1, 2010 valuation determined the ARC for the fiscal years ending June 30, 2012 and June 30, 2013.

As a result of this actuarial valuation of the benefits in effect under the Montana Teachers' Retirement System as of July 1, 2011, we find the current schedule of contributions (shown in the "History of Legislated Contributions" below) is not sufficient to amortize the Unfunded Actuarial Accrued Liability (UAAL) of the Retirement System over 30 years. The Funded Ratio is 61.53%. A 30-year amortization period is the maximum acceptable amortization period specified in Statements No. 25 and 27 of the Governmental Accounting Standards Board (GASB). Therefore, when measured by that standard, the System is not actuarially sound.

History of Legislated Contributions
(as a Percent of Pay)

School District and Other Employers

	Members	Employers	General fund	Total employee & employer
Prior to July 1, 2007	7.15%	7.47%	0.11%	14.73%
July 1, 2007 to June 30, 2009	7.15%	7.47%	2.39%	16.73%
July 1, 2009 and after	7.15%	7.47%	2.49%	17.11%

State and University Employers

	Members	Employers	General fund	Total employee & employer
Prior to July 1, 2007	7.15%	7.47%	0.11%	14.73%
July 1, 2007 to June 30, 2009	7.15%	9.47%	0.11%	16.73%
July 1, 2009 and after	7.15%	9.85%	0.11%	17.11%

Contribution Increases to Amortize UAAL Over 30 Years

Based on the results of the July 1, 2011 valuation, the current statutory contribution rate of 17.11% is not sufficient to amortize the UAAL over 30 years due primarily to recognition of prior years investment losses. As a result, the required contribution rate determined as of July 1, 2011 indicates that the contributions to the System must be increased 3.53% of pay (17.11% to 20.64%)

The required increases will meet the funding policy adopted by the Board and will amortize the UAAL over a 30 year period beginning July 1, 2013.

Calculations based on the Market Value of Assets

MCA 19-20-201 requires this report to show how market performance is affecting the actuarial funding of the Retirement System. The July 1, 2011 market value of assets is $105.9 million more than the actuarial value of assets due to a 21.67% market return in the year ending June 30, 2011. If the market value of assets was used, the amortization period would be 58 years, and the Funded Ratio would be 63.81%.

Based on market assets, a contribution increase of 2.82% of pay (17.11% to 19.93%) is projected to amortize the UAAL over a 30 year period beginning July 1, 2013.

Additional Details

MCA 19-20-604 states that the contribution from the State General Fund will be reduced by 0.11% when the amortization period of the System's UAAL is 10 years or less according to the System's latest actuarial valuation.

The actuarial costs are calculated using the entry age actuarial cost method. This is the method used by most public plans. It is designed to provide a stable contribution rate as a percent of member pay. This actuarial valuation measures the adequacy of the contribution rates set in Montana State Law.

Investment Experience

The market assets earned 21.67% net of investment and operating expenses. As a result of prior years unrecognized losses, the actuarial assets earned -0.13% which is 7.88% less than the actuarial assumption of 7.75%. The return on the actuarial assets differs from the return on market assets because the actuarial value of assets spreads gains and losses over four years. The following chart compares the annual returns for the past ten years.

Year	Market Return	Actuarial Return	Market Return over Assumption*	Actuarial Return over Assumption*
7/1/2001 to 6/30/2002	(7.26)%	3.83%	(15.26)%	(4.17)%
7/1/2002 to 6/30/2003	6.16%	1.60%	(1.84)%	(6.40)%
7/1/2003 to 6/30/2004	13.31%	2.12%	5.31%	(5.88)%
7/1/2004 to 6/30/2005	8.04%	2.71%	0.29%	(5.04)%
7/1/2005 to 6/30/2006	8.91%	8.46%	1.16%	0.71%
7/1/2006 to 6/30/2007	17.64%	10.22%	9.89%	2.47%
7/1/2007 to 6/30/2008	(4.88)%	7.18%	(12.63)%	(0.57)%
7/1/2008 to 6/30/2009	(20.80)%	(10.26)%	(28.55)%	(18.01)%
7/1/2009 to 6/30/2010	12.87%	9.78%	5.12%	2.03%
7/1/2010 to 6/30/2011	21.67%	(0.13)%	13.92%	(7.88)%

** The actuarial assumption was 8.0% through 6/30/2004 and 7.75% thereafter.*

Asset gains or losses result when the return on the actuarial value of assets differs from the actuarial investment return assumption of 7.75% (8.0% before July 1, 2004).

On a market value basis the System earned $116.1 million more than anticipated by the 7.75% assumption in the year ended June 30, 2010 and $345.1 million more than anticipated by the 7.75% assumption in the year ended June 30, 2011. The net result as of July 1, 2011 is that the market value of assets is $105.9 million more than the actuarial value of assets. This $105.9 million in unrecognized asset gains will cause the contributions needed to amortize the UAAL in future valuations to decrease. However, to stay financially sound in the future, the System will need either (1) additional future gains such as asset returns over the 7.75% assumption, or (2) an increase in contribution rates or some of both.

Recent Contribution Increases

As shown in the "History of Legislated Contributions" at the beginning of this section, the employer contributions from the General Fund have increased to 2.49% of pay as of July 1, 2009. The supplemental contribution to ensure university member benefits are funded by university employers was increased from 4.04% to 4.72% of Optional Retirement Plan (ORP) member pay at July 1, 2007. These additional contributions helped bring the amortization period of the System's UAAL under 30 years at July 1, 2007. The valuation that determined the 4.72% contribution rate of ORP member pay was based on the valuation completed as of July 1, 2006. Based on the recent ORP valuation completed as of July 1, 2010, the supplemental contribution needs to be increased to 8.54% to maintain actuarial soundness and an amortization period within 30 years. Unfortunately, cumulative poor asset performance for the three years ended June 30, 2010 resulted in the increase in contributions.

Amortization Period Changes

The July 1, 2010 actuarial valuation calculated an amortization period of 49.5 years for the UAAL. The experience loss (primarily asset losses) increased the amortization period. The resulting amortization period at July 1, 2011 is 71 years.

Funding and Benefits Policy

The Teachers' Retirement System has adopted a Funding and Benefits Policy to provide general guidelines to help ensure decisions are made based on sound, consistent, and thoroughly examined criteria. The Funding and Benefits Policy includes guidance on the following topics:

1) Additional Funding
    a) The Funding and Benefits Policy states: "Whenever the amortization period of the unfunded liabilities for two consecutive valuations are projected to exceed 30 years based on the market value of assets, or the funded ratio is less than 85%, and the Board cannot reasonably anticipate that the amortization period would decline or the funded ratio improve without an increase in funding sources, it is the obligation of the Board to recommend to the legislature that funding be increased and/or liabilities be reduced."
    b) Analysis: The amortization period at July 1, 2011 is 71 years based on actuarial assets and 58 years based on market assets. Assuming experience follows the actuarial assumptions, the amortization period is projected to remain above 30 years based on both measures for some time to come. The funded ratio on actuarial value of assets is currently 61.53%. Therefore, the guidance in the Board's Funding and Benefits Policy indicates the Board should "recommend to the legislature that funding be increased and/or liabilities be reduced."
2) Ultimate Goal
    a) The Funding and Benefits Policy states: "It is the ultimate goal of the TRS to eliminate the current UAAL and to establish a Stabilization Reserve equal to at least 10% of the Actuarial Accrued Liability. Once the system has achieved this goal, any surplus funds that become available may be applied toward the cost of benefit enhancements and/or contribution reductions, provided, sufficient reserves are retained to reasonably allow for adverse experience and the contribution rates remain at least 1 percent above the normal cost."
    b) Analysis: This goal is currently a long way off. This is represented by a 58 and 71 year amortization periods on a market value of assets and an actuarial value of assets basis respectively. Discipline will be required by all parties concerned to reach this goal, and will have to include contribution increases to maintain the amortization period within 30 years.

3) Benefit Enhancements

   a) The Funding and Benefits Policy states: "Proposed benefit enhancements must include additional funding sufficient to cover any increase in the normal cost and to amortize any increase in UAAL over a period not to exceed 25 years. In addition, as of the most recent actuarial valuation, the funded ratio must be 85% or greater before the Board will support legislation to enhance benefits."

   b) Analysis: Since the funded ratio at July 1, 2011 of 61.53% is below 85% the Board's Funding and Benefits policy does not currently support enhanced benefits, even if funding of increased UAAL over 25 years is included.

Sensitivity to Future Experience

The valuation results are projections based on the actuarial assumptions. Actual experience will differ from these assumptions, either increasing or decreasing the ultimate cost. The following illustrations provide simple analyses on how the costs are sensitive to changes in the assumed rate of return. We have amortized changes in the UAAL over 25 years for the purpose of these illustrations.

Investment Return – The investment return assumption generally has the largest impact on the funding of the System.

Impact of Assuming 0.5% Lower Investment Return	
	Funded Ratio
Current Assumption 7.75%	61.53%
Lower Assumption 7.25%	58.07%
Change	-3.46%
	Implied Contribution Increase / (Decrease)
Normal Cost Rate	1.15%
25 year amortization of UAAL	1.94%
Total	3.09%
Impact of Assuming 1.0% Lower Investment Return	
	Funded Ratio
Current Assumption 7.75%	61.53%
Lower Assumption 6.75%	54.72%
Change	-6.81%
	Implied Contribution Increase / (Decrease)
Normal Cost Rate	2.47%
25 year amortization of UAAL	3.86%
Total	6.33%

The future funding status of the System will be determined by the System's experience. The System's actual asset returns and retirement rates, as well as member longevity, salary increases, withdrawal rates, disability rates and future legislation will all impact the funding status of the System. The entry age normal cost method and four year smoothing of asset gains and losses will help to provide a more orderly funding of the System's liabilities, but will not change the actual experience. The amortization period of the UAAL is not likely to decrease by the expected 1.0 year with each passing actuarial valuation. Instead, the amortization period is expected to decrease more or less than 1.0 years each year, reflecting gains and losses due to experience different than the actuarial assumptions.

Assumption Changes

There have been no changes since the previous valuation

Benefit Changes

Since the previous valuation, the early retirement reduction factors were changed to true actuarial equivalent factors. The impact of these changes was a reduction in the UAAL of $6.7 million and a 0.12% decrease in the normal rate.

Contribution Changes

The contribution rate changes are documented at the beginning of this summary.

Method Changes

Since the previous valuation, there have been no methodology changes.

Impact of Changes

The following table summarizes how experience has changed the UAAL since the July 1, 2010 Actuarial Valuation. Further detail can be found in Table 12.

Changes in the Unfunded Actuarial Accrued Liability (UAAL)

(In millions)

July 1, 2010 Valuation UAAL	$ 1,561.6
Expected Increase	22.5
Expected July 1, 2011 UAAL	$ 1,584.1
Experience Gain on Actuarial Liabilities	$ (15.1)
Experience Loss on Actuarial Assets	229.8
Assumption and Method Changes	(6.7)
Total Loss	$ 208.0
July 1, 2011 Valuation UAAL	$ 1,792.1

Summary

- The System's actuarial value investment return of (0.13)% for the year ended June 30, 2011 is 7.88% less than the actuarial assumption of 7.75%. This represents an asset loss of $229.8 million due to investment return less than anticipated. The actuarial value of assets is not allowed to be greater than 120% or less than 80% of the market value of assets. As of July 1, 2011, the market value of assets was $2,972.4 million. As of July 1, 2011 the preliminary actuarial value of assets was $2.866.4 million. Since the preliminary actuarial value is within the corridor therefore no adjustment is required to the preliminary actuarial value of assets. The July 1, 2011 market value of assets is $105.9 million more than the actuarial value of assets. This $105.9 million gain will be recognized in future actuarial valuations unless it is offset by returns less than the 7.75% assumption.

- The amortization period of the UAAL is 71 years. The guidance in the Board's Funding and Benefits Policy indicates the Board should "recommend to the legislature that funding be increased and/or liabilities be reduced." The Policy's ultimate goal is to increase the current net funded ratio of 61.53% above 110% to encourage stable contribution rates.

- The funding of the retirement system will be impacted by future experience which will sometimes be more favorable than the actuarial assumptions and sometimes less favorable. In particular, investment returns larger and smaller than the 7.75% assumption are expected to have significant impacts on the System's funding progress. In the long term, the favorable experience is needed to offset the less favorable experience This is the reason for using an actuarial value of assets that smoothes gains and losses over four years.

Section 2

Assets

In many respects, an actuarial valuation can be regarded as an inventory process. The inventory is taken as of the actuarial valuation date, which for this valuation is July 1, 2011. On that date, the assets available for the payment of benefits are appraised. These assets are compared with the actuarial liabilities. The actuarial process thus leads to a method of determining what contributions by members and their employers are needed to strike a balance.

The asset valuation method being used is a four-year smoothing method. The expected return is determined each year based on the beginning of year market value and actual cash flows during the year. Any difference between the expected market value return and the actual market value return is recognized evenly over a period of four years. The actuarial value of assets is not allowed to be greater than 120% or less than 80% of the market value of assets.

Table 1 lists the assets held and their market value for the past two years. Table 2 summarizes the fund's activity during the past two years. Table 3 summarizes the determination of the actuarial value of assets. Table 4 summarizes historical asset returns for the last 15 years including the amount recognized by the actuarial asset valuation method which was greater or lesser than the actuarial investment return assumption.

Teachers' Retirement System
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Table 1

Statement of Fiduciary Net Assets

	TOTAL TRS 2011	TOTAL TRS 2010
ASSETS		
Cash/Cash Equivalents-Short Term		
Investment Pool	$ 49,573,673	$ 46,808,594
Receivables:		
Accounts Receivable	18,726,665	19,916,535
Interest Receivable	4,462,165	4,110,813
Due from Primary Government	-	-
Total Receivables	$ 23,188,830	$ 24,027,348
Investments, at fair value:		
Mortgages	$ -	$ 16,342,528
Investment Pools	2,899,968,475	2,426,072,098
Other Investments	-	8,383,070
Securities Lending Collateral	146,389,177	162,097,378
Total Investments	$ 3,046,357,652	$ 2,612,895,074
Assets Used in Plan Operations:		
Land and Buildings	$ 193,844	$ 193,844
Less: Accumulated Depreciation	(150,545)	(150,545)
Equipment	142,697	142,697
Less: Accumulated Depreciation	(70,489)	(49,458)
Prepaid Expenses	6,401	7,380
Intangible Assets, net of amortization	28,443	106,371
Total Other Assets	$ 150,351	$ 250,289
TOTAL ASSETS	$ 3,119,270,506	$ 2,683,981,305
LIABILITIES		
Accounts Payable	$ 86,396	$ 111,324
Due to Primary Government	-	-
Acountability for Advances	-	-
Securities Lending Liability	146,389,177	162,097,378
Compensated Absences	180,541	182,728
OPEB Implicit Rate Subsidy	195,172	144,155
TOTAL LIABILITIES	$ 146,851,286	$ 162,535,585
NET ASSETS HELD IN TRUST FOR PENSION BENEFITS	$ 2,972,419,220	$ 2,521,445,720

Teachers' Retirement System
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Table 2

Statement of Changes in Fiduciary Net Assets

	TOTAL TRS 2011	TOTAL TRS 2010
ADDITIONS		
Contributions:		
Employer	$ 72,879,950	$ 72,179,128
Plan Member	62,993,192	62,844,529
Other	17,437,366	17,241,610
Total Contributions	$ 153,310,508	$ 152,265,267
Misc Income	$ 16,539	$ 65,233
Investment Income:		
Net Appreciation/(Depreciation) in Fair Value of Investments	$ 455,020,967	$ 199,503,703
Investment Earnings	99,119,730	109,898,071
Security Lending Income	1,200,925	1,253,635
Investment Income/(Loss)	$ 555,341,622	$ 310,655,409
Less: Investment Expense	15,978,901	15,350,943
Less: Security Lending Expense	334,365	349,935
Net Investment Income/(Loss)	$ 539,028,356	$ 294,954,531
Total Additions	$ 692,355,403	$ 447,285,031
DEDUCTIONS		
Benefit Payments	$ 235,122,805	$ 220,193,357
Withdrawals	4,364,713	4,165,835
Administrative Expense	1,843,368	1,905,124
OPEB Expenses	51,017	47,181
Total Deductions	$ 241,381,903	$ 226,311,497
NET INCREASE (DECREASE) IN PLAN NET ASSETS	$ 450,973,500	$ 220,973,534
NET ASSETS HELD IN TRUST FOR PENSION BENEFITS BEGINNING OF YEAR	$ 2,521,445,720	$ 2,301,828,565
ADJUSTMENT	$ -	$ (1,356,379)
END OF YEAR	$ 2,972,419,220	$ 2,521,445,720

Teachers' Retirement System
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Table 3
Determination of Actuarial Value of Assets

Valuation Date July 1:	2010	2011	2012	2013	2014
A. Actuarial Value Beginning of Year	$3,067,668,352	$ 2,956,583,029			
B. Market Value End of Year	2,521,445,720	2,972,419,220			
C. Market Value of Beginning of Year	2,301,828,565	2,521,445,720			
D. Cash Flow					
D1. Contributions	152,265,267	153,310,508			
D2. Benefit Payments	(224,359,192)	(239,487,518)			
D3. Net	$ (72,093,925)	$ (86,177,010)			
E. Investment Income					
E1. Market Total: B. - C. - D3.	$ 291,711,080	$ 537,150,510			
E2. Assumed Rate	7.75%	7.75%			
E3. Amount for Immediate Recognintion	175,598,074	192,072,684			
E4. Amount for Phased-in Recognition	116,113,006	345,077,826			
F. Phased-In Recognition of Investment Income					
F1. Current Year: 0.25 * E4.	$ 29,028,252	$ 86,269,457	$ -	$ -	$ -
F2. First Prior Year	(210,928,844)	29,028,252	86,269,457	-	-
F3. Second Prior Year	(100,364,374)	(210,928,844)	29,028,252	86,269,457	-
F4. Third Prior Year	67,675,494	(100,364,374)	(210,928,844)	29,028,252	86,269,457
F5. Total Recognized Investment Gain	$ (214,589,472)	$ (195,995,509)	$ (95,631,135)	$ 115,297,709	$ 86,269,457
G. Preliminary Actuarial Value End of Year A. + D3. + E3. + F5.	$2,956,583,029	$ 2,866,483,194			
H. Corridor					
H1. 80% of Market Value	$2,017,156,576	$ 2,377,935,376			
H2. 120% of Market Value	3,025,734,864	3,566,903,064			
I. Actuarial Value End of Year G. Not Less than H1. or Not Greater than H2	$2,956,583,029	$ 2,866,483,194			
J. Difference Between Market & Actuarial Values	$ (435,137,309)	$ 105,936,026			

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Table 4

Historical Investment Returns*

Fiscal Year Ending	Market Returns	Actuarial Returns	Actuarial Return Over 8.00% Assumption
June 30, 1997	19.4%	14.9%	6.9%
June 30, 1998	16.6%	16.0%	8.0%
June 30, 1999	11.9%	12.3%	4.3%
June 30, 2000	7.8%	12.8%	4.8%
June 30, 2001	(5.1)%	9.2%	1.2%
June 30, 2002	(7.3)%	3.8%	(4.2)%
June 30, 2003	6.2%	1.6%	(6.4)%
June 30, 2004	13.3%	2.1%	(5.9)%
Fiscal Year Ending	**Market Returns**	**Actuarial Returns**	**Actuarial Return Over 7.75% Assumption**
June 30, 2005	8.0%	2.7%	(5.0)%
June 30, 2006	8.9%	8.5%	0.7%
June 30, 2007	17.6%	10.2%	2.5%
June 30, 2008	(4.9)%	7.2%	(0.6)%
June 30, 2009	(20.8)%	(10.3)%	(18.0)%
June 30, 2010	12.9%	9.8%	2.0%
June 30, 2011	21.7%	(0.1)%	(7.9)%
15 Year Average	6.4%	6.5%	(1.4)%

* *Returns reflect all investment returns, including investment income and realized and unrealized investment gains and losses, and are net of investment expenses and administrative expenses paid by the System.*

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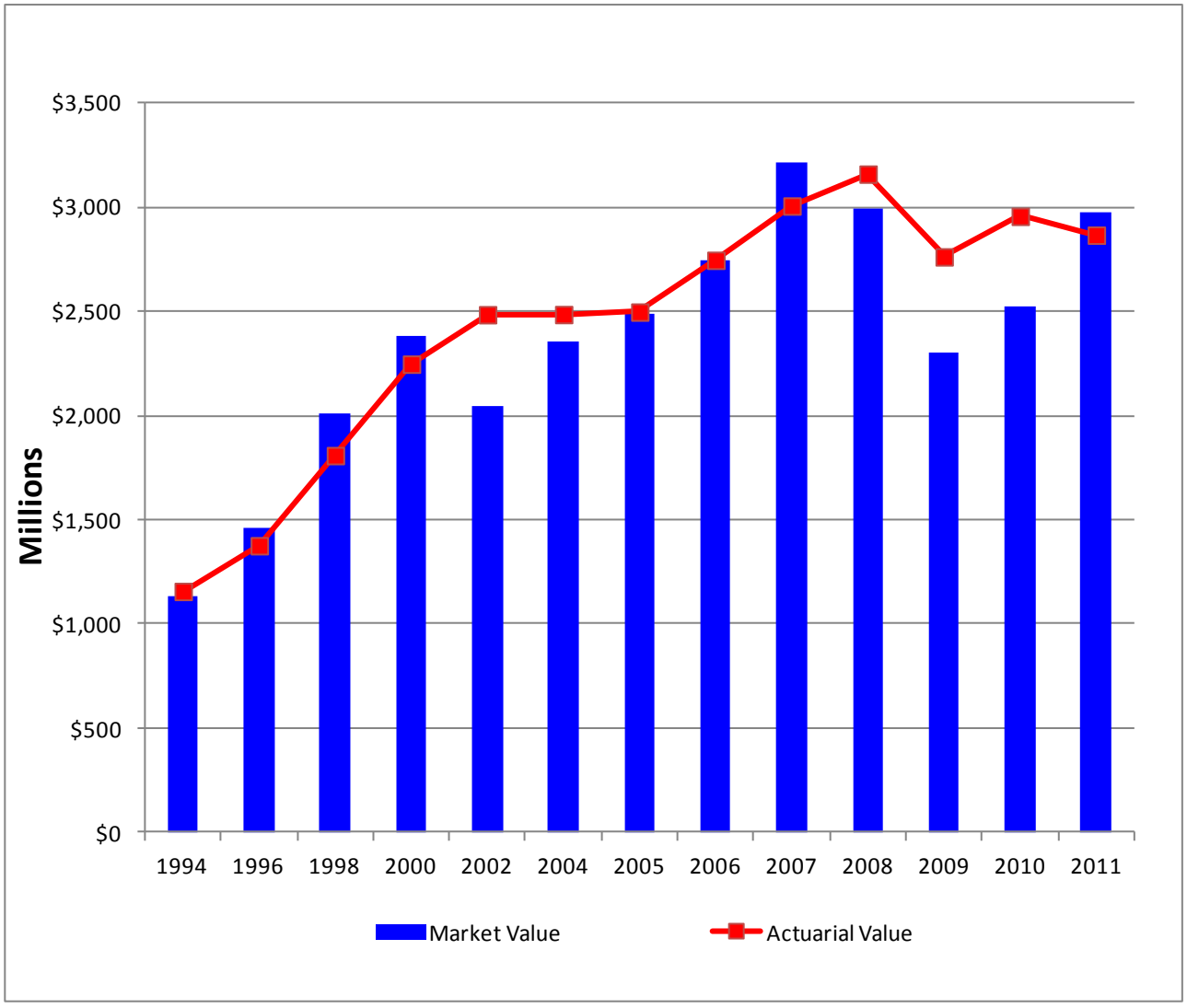
Table 5

Market Value of Assets vs. Actuarial Value of Assets



Teachers' Retirement System
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Section 3

Actuarial Present Value of Future Benefits

In the previous section, an actuarial valuation was related to an inventory process, and an analysis was given of the inventory of assets of the System as of the valuation date. In this section, the discussion will focus on the commitments of the System, which will be referred to as its actuarial liabilities.

Table 6 contains an analysis of the actuarial present value of all future benefits for contributing members, for former contributing members, and for beneficiaries. The analysis is given by type of benefit.

The actuarial liabilities summarized in Table 6 include the actuarial present value of all future benefits expected to be paid with respect to each member covered as of the valuation date. For an active member, this value includes a measure of both benefits already earned and future benefits to be earned. Thus, for all members, active and retired, the value extends over benefits earnable and payable for the rest of their lives and, if an optional benefit is chosen, for the lives of their surviving beneficiaries.

The actuarial valuation does not recognize liabilities for employees who become members and participate in the System after the valuation date.

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Table 6

Actuarial Present Value of Future Benefits for Contributing Members, Former Contributing Members, and Beneficiaries

(All amounts are actuarial present values in millions)

	July 1, 2011 Total	July 1, 2010 Total
A. Active Members		
Service Retirement	$ 2,332.0	$ 2,347.1
Disability Retirement	13.8	13.8
Survivors' Benefits	53.5	53.5
Vested Retirement	30.1	29.3
Refund of Member Contributions	29.8	30.0
Total	$ 2,459.2	$ 2,473.7
B. Inactive Members and Annuitants		
Service Retirement	$ 2,545.2	$ 2,388.7
Disability Retirement	20.8	20.9
Beneficiaries*	155.4	147.5
Vested Terminated Members	55.0	68.9
Refund of Member Contributions	16.5	16.3
Total	$ 2,792.9	$ 2,642.2
C. Grand Total	$ 5,252.1	$ 5,115.9

** Includes survivors of active and retired members, and children's benefits*

Teachers' Retirement System
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Section 4

Employer Contributions

In the previous two sections, attention has been focused on the assets and the present value of all future benefits of the System. A comparison of Tables 3 and 6 indicates that there is a shortfall in current actuarial assets to meet the present value of all future benefits for current members and beneficiaries.

In an active system, there will always be a difference between the assets and the present value of all future benefits. An actuarial valuation sets a schedule of future contributions that will deal with this funding in an orderly fashion.

The method used to determine the incidence of the contributions in various years is called the actuarial cost method. For this valuation, the entry age actuarial cost method has been used. A description of the entry age actuarial cost method is provided in Appendix A. Under this method, or essentially any actuarial cost method, the contributions required to meet the difference between current assets and the present value of all future benefits are allocated each year between two elements:

> A normal cost amount, which ideally is relatively stable as a percentage of salary over the years;
>
> and an amount which is used to amortize is the UAAL.

The two items described above, normal cost and UAAL, are the keys to understanding the actuarial cost method. Let us first discuss the normal cost.

The normal cost is the theoretical contribution rate, which will meet the ongoing costs of a group of average new employees. Suppose that a group of new employees were covered under a separate fund from which all benefits and to which all contributions and associated investment return were to be paid. Under the entry age actuarial cost method, the normal cost contribution rate is that level percentage of pay which would be exactly right to maintain this fund on a stable basis. If experience were to follow the actuarial assumptions exactly, the fund would be completely liquidated with the last payment to the last survivor of the group.

We have determined the normal cost rates separately by type of benefit under the System. These are summarized in Table 7. In Table 7 we also provide a summary of the member and employer statutory contributions and ARC under GASB.

The term "fully funded" is often applied to a system where contributions for everyone at the normal cost rate will fully pay for the benefits of existing as well as new employees. Often, systems are not fully funded, either because of benefit improvements in the past that have not been completely paid for or actuarial deficiencies that have occurred because experience has not been as favorable as anticipated. Under these circumstances, a UAAL exists.

Table 8 shows how the UAAL was derived for the System. Lines A and B show, respectively, the total present value of future benefits and the portion of the future liability that is expected to be paid from future normal cost contributions, both employer and employee. Line C shows the actuarial accrued liability. Line E shows the amount of assets available for benefits. Line F shows the UAAL.

The amortization of the UAAL assumes university supplemental contributions are made as a percent of pay for members of the Optional Retirement Plan (ORP) until June 30, 2033. Under Section 19-20-621, periodic separate valuations are to be performed to measure the liabilities of benefits to be paid under the Teachers' Retirement System (TRS) for Montana University System (MUS) members. The MUS valuations calculate contribution rates that finance the university member benefits with university contributions and reflect actual experience including investment returns. Therefore the university supplemental contribution rate has varied from time to time. Recently it has varied as follows:

Supplemental University Contribution Rate	Fiscal Years Ending
2.81%	June 30, 1998
3.12%	June 30, 1999
3.42%	June 30, 2000
3.73%	June 30, 2001
4.04%	June 30, 2002 to June 30, 2007
4.72%	June 30, 2008 to June 30, 2033

The value of future supplemental university contributions included in the July 1, 2011 TRS valuation is $155.1 million based on a 4.72% contribution rate until July 1, 2033.

The UAAL at any date after establishment of a system is affected by any actuarial gains or losses arising when the actual experience of the system varies from the experience anticipated by the actuarial assumptions used in the valuations. To the extent actual experience as it develops differs from the assumptions used, so also will the actual emerging costs differ from the estimated costs. The impact of these differences in actual experience from the assumptions is included in Section 1, the Summary of Findings.

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Table 7

Normal Cost Contribution Rates
As Percentages of Salary

	July 1, 2011 Total	July 1, 2010 Total
Service retirement	7.72%	7.82%
Disability retirement	0.08%	0.08%
Survivors' benefits	0.26%	0.26%
Vested retirement	0.42%	0.42%
Refund of member contributions	1.16%	1.16%
Total Normal Rate	9.64%	9.74%
Employee Normal Rate	7.15%	7.15%
Employer Normal Rate	2.49%	2.59%

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Table 8

Unfunded Actuarial Accrued Liability
(Dollar amounts in millions)

	July 1, 2011	July 1, 2010
A. Actuarial present value of all future benefits for present and former members and their survivors (Table 6)	$ 5,252.1	$ 5,115.9
B. Less actuarial present value of total future normal costs for present members	593.5	597.7
C. Actuarial accrued liability	$ 4,658.6	$ 4,518.2
D. Less present value of future university supplemental contributions*	N/A	N/A
E. Less assets available for benefits	2,866.5	2,956.6
F. Unfunded actuarial accrued liability	$ 1,792.1	$ 1,561.6

* *Paid by contributions to TRS made as a percentage of the salaries of the participants in the Optional Retirement Plan (ORP) to fund Montana University System member benefits. The percentage of salary will be a level 4.72% for the Fiscal Years through 2033.*

Teachers' Retirement System
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Section 5

Cash Flows

The fundamental equation for funding a retirement system is that benefits and administrative expenses must be provided for by contributions (past and future) and investment income. When a retirement system matures, benefits and administrative expenses often exceed contributions. In this case we say the system has a "negative cash flow." Mature systems are characterized by negative cash flows and large pools of assets. This is natural. Actuarial funding is designed to accumulate large pools of assets which will in turn provide investment income and finance negative cash flows when systems mature. If the fund is looked at as a whole, investment income is usually larger than the difference between contributions and benefit payments. The retirement system's investment strategy should maximize potential returns at a prudent level of risk while providing for needed cash flows.

Table 9 shows the System had a positive cash flow for the year ended June 30, 2011. The System's total cash flow including benefits payments, administrative expenses and investment earnings was $450.9 million. Of the $450.9 million, $539.0 million was due to investment returns.

Table 10 shows that at the current statutory contribution rate and if the System's assets earn the assumed investment rate of return of 7.75%, the System has a positive cash flow that is trending to become negative after reflecting benefit payments, contributions and investment earnings. This is due to the fact that the current statutory contribution is no longer adequate to fund the System in an actuarial sound manner.

Table 11 shows that if the contributions are contributed to the System as recommended by the Actuary and the System's assets earn the assumed rate of 7.75%, the System is projected to have a positive cash flow in all future years.

As long as the System had a positive cash flow, there was no need to plan where the funds would come from to pay benefits since benefits could be paid by incoming contributions. A negative cash flow, as defined above, requires planning what funds will be used to pay the difference between benefits and contributions. We are providing these projections to aid in developing the investment strategy for the System's assets.

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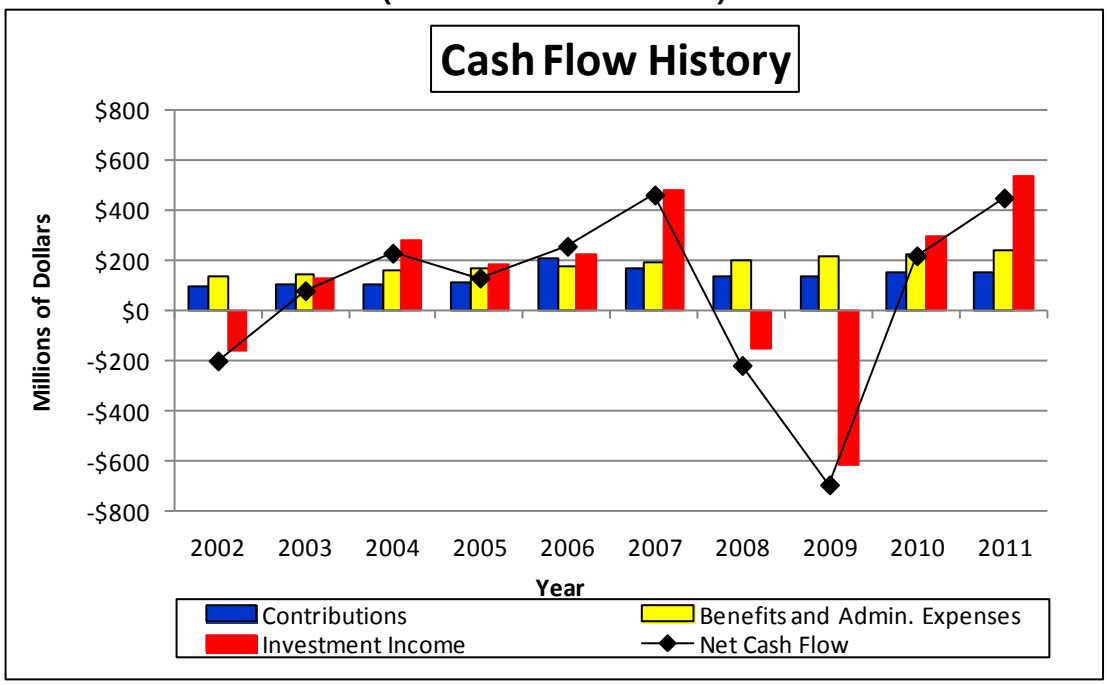
Table 9

Cash Flow History
(Dollar amounts in millions)



Year Ended June 30	Historical Cash Flows: Contributions		Benefits & Administrative Expenses	Investment Income	Net Cash Flow
2002	$ 100.2		$ 138.1	$ (159.6)	$ (197.5)
2003	104.3		148.6	126.2	81.9
2004	107.9		158.5	281.8	231.2
2005	110.7		167.1	188.7	132.3
2006	212.3	*	178.4	224.8	258.7
2007	169.2	**	190.4	484.5	463.3
2008	141.0		203.6	(153.3)	(215.9)
2009	138.3		217.0	(612.8)	(691.5)
2010	152.3		226.3	295.0	221.0
2011	153.3		241.4	539.0	450.9

** Reflects $100 million transfer to TRS*
*** Reflects $50 million transfer to TRS*

Teachers' Retirement System
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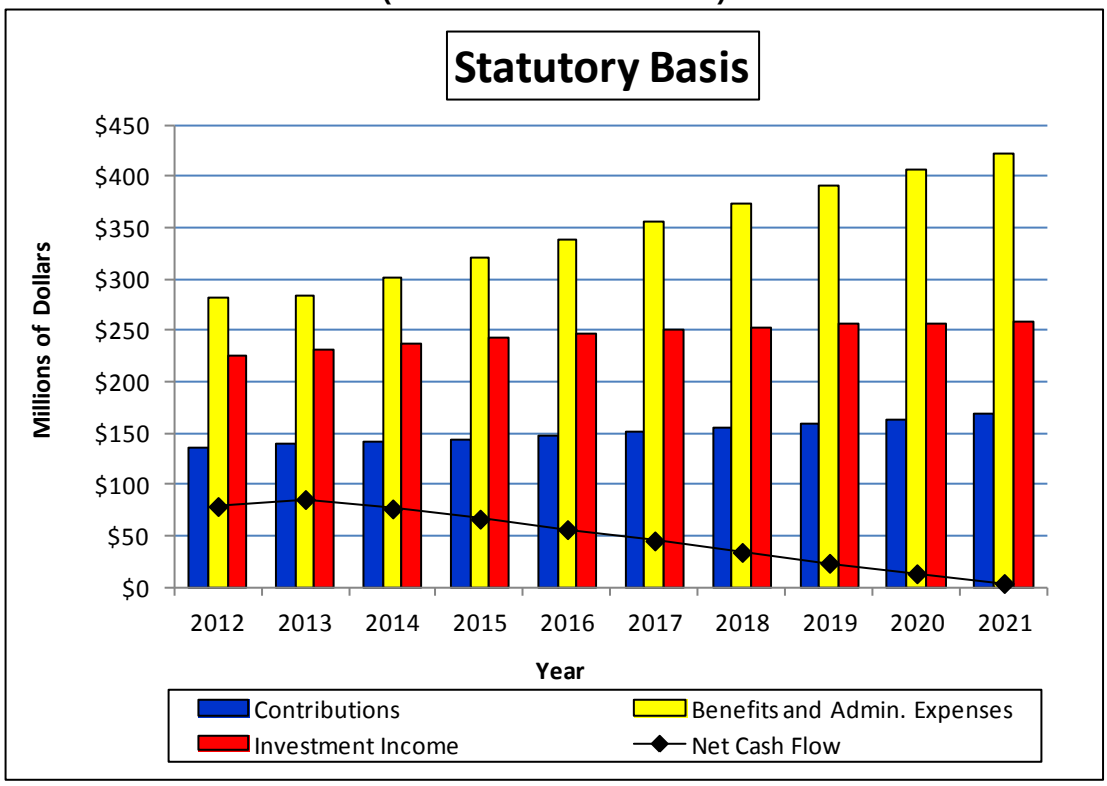
Table 10

Cash Flow Projections
(Dollar amounts in millions)



Year Ended June 30	Projected Cash Flows: Statutory Contributions	Benefits & Administrative Expenses	Assumed Investment Income	Net Cash Flow
2012	$ 136.4	$ 282.3	$ 224.7	$ 78.8
2013	138.7	283.9	230.8	85.6
2014	141.3	301.7	236.9	76.5
2015	144.2	319.9	242.2	66.5
2016	147.5	338.0	246.8	56.3
2017	151.0	356.3	250.6	45.3
2018	154.8	374.3	253.6	34.1
2019	159.0	391.2	255.7	23.5
2020	163.6	407.4	257.1	13.3
2021	168.7	422.6	257.7	3.8

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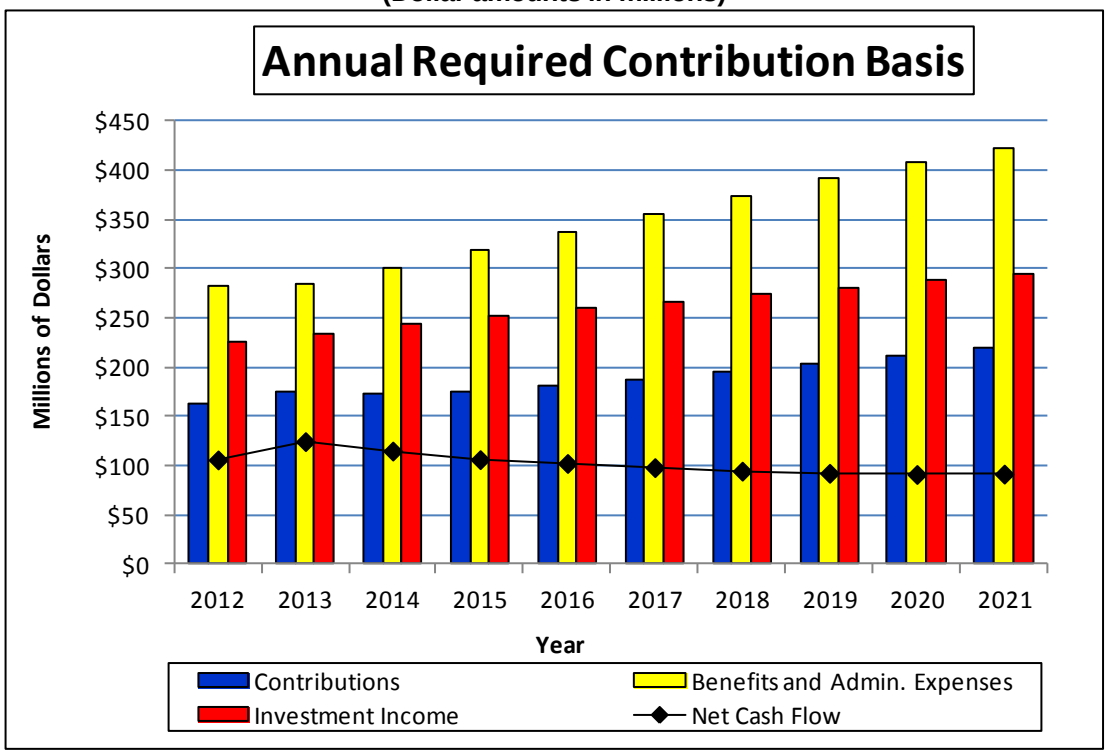
Table 11

Cash Flow Projections
(Dollar amounts in millions)



	Projected Cash Flows			
Year Ended June 30	Annual Required Contributions	Benefits & Administrative Expenses	Assumed Investment Income	Net Cash Flow
2012	$ 162.8	$ 282.3	$ 225.7	$ 106.2
2013	174.3	283.9	234.4	124.8
2014	173.6	301.7	243.3	115.2
2015	174.8	319.9	251.6	106.5
2016	181.2	338.0	259.4	102.6
2017	187.8	356.3	266.9	98.4
2018	195.0	374.3	274.1	94.8
2019	202.7	391.2	281.1	92.6
2020	210.9	407.4	287.9	91.4
2021	219.6	422.6	294.8	91.8

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Section 6

Actuarial Gains or Losses

An analysis of actuarial gains or losses is performed in conjunction with all regularly scheduled valuations.

The results of our analysis of the financial experience of the System in the three most recent regular actuarial valuations are presented in Table 12. Each gain or loss shown represents our estimate of how much the given type of experience caused the Unfunded Actuarial Accrued Liability or Funding Reserve to change in the period since the previous actuarial valuation.

Gains and losses shown due to demographic sources are approximate. Demographic experience is analyzed in greater detail in our periodic assumption studies.

Non-recurring gains and losses result from changes in the actuarial assumptions and benefit improvements.

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Table 12

Analysis of Actuarial Gains or Losses*
(Dollar amounts in millions)

	UAAL (Gain)/Loss		
	June 30, 2011	June 30, 2010	June 30, 2009
Investment Income			
Investment income was (greater) less than expected based on actuarial value of assets.	$ 229.8	$ (55.2)	$ 561.9
Pay Increases			
Pay increases were (less) greater than expected.	(36.7)	(22.0)	(4.4)
Age & Service Retirements			
Members retired at (older) younger ages or with (less) greater final average pay than expected	19.0	13.0	6.3
Disability Retirements			
Disability claims were (less) greater than expected	0.2	0.5	0.4
Death-in-Service Benefits			
Survivor claims were (less) greater than expected	(0.5)	(0.4)	(0.2)
Withdrawal From Employment			
(More) less reserves were released by withdrawals than expected	5.4	6.6	4.7
Death After Retirement			
Retirees (died younger) lived longer than expected	2.6	(3.5)	(2.8)
Data Adjustments			
Service purchases, data corrections, etc.	(10.9)	-	-
Other			
Miscellaneous (gains) and losses	5.8	24.4	12.0
Total (Gain) or Loss During Period From Financial Experience	$ 214.7	$ (36.6)	$ 577.9
Non-Recurring Items.			
Changes in actuarial assumptions and methods	-	156.6	-
Changes in benefits caused a (gain) loss	(6.7)	-	-
Composite (Gain) Loss During Period.	$ 208.0	$ 120.0	$ 577.9

* *Effects related to gains are shown in parentheses. Numerical results are expressed as a (decrease) increase in the Unfunded Actuarial Accrued Liability (UAAL). Gains decrease the UAAL and losses increase the UAAL.*

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Appendix A

Actuarial Procedures and Assumptions

Retirement, disablement and termination of employment assumptions have been revised to reflect the five-year experience study for the period ending 2009 adopted by the Board on May 13, 2010. These actions reflect the recommended changes in the Experience Study.

The current asset valuation method was adopted for the July 1, 2007 valuation.

Tables A-3 through A-6 give rates of decrement for service retirement, disablement, mortality, and other terminations of employment.

Actuarial Cost Method

The actuarial valuation was prepared using the entry age actuarial cost method. Under this method, the actuarial present value of the projected benefits of each individual included in the valuation is allocated as a level percentage of the individual's projected compensation between entry age and assumed exit. The portion of this actuarial present value allocated to a valuation year is called the normal cost. The normal cost was first calculated for each individual member. The normal cost rate is defined to equal the total of the individual normal costs, divided by the total pay rate.

The portion of this actuarial present value not provided for at a valuation date by the sum of (a) the actuarial value of the assets and (b) the actuarial present value of future normal costs is called the UAAL. The UAAL is amortized as a level percentage of the projected salaries of present and future members of the System.

Records and Data

The data used in the valuation consist of financial information; records of age, sex, service, salary, contribution rates, and account balances of contributing members; and records of age, sex, and amount of benefit for retired members and beneficiaries. All of the data were supplied by the System and are accepted for valuation purposes without audit.

Replacement of Terminated Members

The ages at entry and distribution by sex of future members are assumed to average the same as those of the present members they replace. If the number of active members should increase, it is further assumed that the average entry age of the larger group will be the same, from an actuarial standpoint, as that of the present group. Under these assumptions, the normal cost rates for active members will not vary with the termination of present members.

Employer Contributions

At the time of this valuation, the total employer contribution rate for normal costs and amortization of the UAAL was 9.96% of members' salaries. In accordance with MCA 19-20-604, the employer contribution rate will be reduced by 0.11% when the amortization period of the System's UAAL is 10 years or less according to the System's latest actuarial valuation.

Administrative and Investment Expenses

The administrative and investment expenses of the System are assumed to be funded by investment earnings in excess of 7.75% per year.

Valuation of Assets - Actuarial Basis

The actuarial asset valuation method spreads asset gains and losses over four years. The expected return is determined each year based on the beginning of year market value and actual cash flows during the year. Any difference between the expected market value return and the actual market value return is recognized evenly over a period of four years. The gains and losses are measured starting with the year ended June 30, 2007. The actuarial value of assets is not allowed to be greater than 120% or less than 80% of the market assets. (Adopted effective July 1, 2007.)

Investment Earnings

The annual rate of investment earnings of the assets of the System is assumed to be 7.75% per year, compounded annually. (Adopted effective July 1, 2004)

Interest on Member Contributions

Interest on member contributions is assumed to accrue at a rate of 5% per annum, compounded annually. This assumption was set as of July 1, 2004.

Postretirement Benefit Increases

On January 1 of each year, the retirement allowance payable must be increased by 1.5% if the retiree has received benefits for at least 36 months prior to January 1 of the year in which the adjustment is to be made.

Future Salaries

The rates of annual salary increase assumed for the purpose of the valuation are illustrated in Table A-2. In addition to increases in salary due to merit and longevity, this scale includes an assumed 4.5% annual rate of increase in the general wage level of the membership. The merit and longevity increases for the MUS members did not show a pattern of increasing or decreasing with service at the time of our most recent study. Therefore, the MUS members have a flat 1% merit and longevity assumption. The general wage increase assumption was adopted July 1, 2004 and the merit and longevity scales were adopted July 1, 2002.

Montana University System (MUS) members are assumed to have a 0.63% higher average final compensation to account for the larger than average annual compensation increases observed in the years immediately preceding retirement.

Service Retirement

Table A-3 shows the annual assumed rates of retirement among members eligible for service retirement. Separate rates are used when a member is eligible for reduced benefits, for the first year a member is eligible for full benefits, and for the years following the first year a member is eligible for full benefits. The rates for General Members were adopted May 13, 2010. The rates for University Members were adopted May 13, 2010.

Disablement

The rates of disablement used in this valuation are illustrated in Table A-4. These rates were adopted May 13, 2010.

Mortality

The mortality rates used in this valuation are illustrated in Table A-5. A written description of each table used is included in Table A-1. These rates were adopted July 1, 2006.

Other Terminations of Employment

The rates of assumed future withdrawal from active service for reasons other than death, disability or retirement are shown for representative ages in Table A-6. These rates were adopted May 13, 2010.

Benefits for Terminating Members

Members terminating with less than five years of service are assumed to request an immediate withdrawal of their contributions with interest. Table A-7 shows the assumed probability of retaining membership in the System among members terminating with five or more years of service. These rates were adopted July 1, 2002.

We estimated the present value of future benefits for terminated vested members based on the greater of the present value of their deferred benefit at age 60 or their available contribution account.

Part-Time Employees

The valuation data for active members identify part-time members. Part-time members earning less than $1,000 during the last year were valued at their current member contribution balance.

Optional Retirement Program

ORP payroll as of June 30, 2010 was $183,718,592.

Effective for fiscal years after June 30, 2007 until June 30, 2033, the Optional Retirement Program contribution rate is 4.72%, pursuant to MCA 19-20-621.

Buybacks, Purchase of Service, and Military Service

The active liabilities and normal cost (excluding liabilities and normal cost in respect of Return of Employee Contributions) were increased to 100.5% of their original value to fund this additional service based on a study of the System's experience for the five calendar years 1995 through 1999. Effective July 1, 2008.

Probability of Marriage

If death occurs in active status, all members are assumed to have an eligible surviving spouse and two children. The spouse is assumed to be the same age as the member.

Records with no Birth Date

New records with no birth date are assumed to be 25 years old. Records that are not new and have no birth date used the same birth date as the prior year's valuation.

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Table A-1

Summary of Valuation Assumptions
(July 1, 2010)

I.	Economic assumptions		
	A.	General wage increases* (Adopted July 1, 2004)	4.50%
	B.	Investment return (Adopted July 1, 2004)	7.75%
	C.	Price Inflation Assumption (Adopted July 1, 2004)	3.50%
	D.	Growth in membership	0.00%
	E.	Postretirement benefit increases (Starting three years after retirement)	1.50%
	F.	Interest on member accounts (Adopted July 1, 2004)	5.00%
II.	Demographic assumptions		
	A.	Individual salary increase due to promotion and longevity (General Member assumptions adopted July 1, 2002) (University Member assumptions adopted July 1, 2000)	Table A-2
	B.	Retirement (adopted May 13, 2010)	Table A-3
	C.	Disablement (adopted May 13, 2010)	Table A-4
	D.	Mortality among contributing members, service retired members, and beneficiaries For Males: RP 2000 Combined Mortality Table for Males, set back three years, with mortality improvements projected by Scale AA to 2008 (adopted July 1, 2006). For Females: RP 2000 Combined Mortality Table for Females, set back two years, with mortality improvements projected by Scale AA to 2008 (adopted July 1, 2006).	Table A-5
	E.	Mortality among disabled members For Males: RP 2000 Disabled Mortality Table for Males, set back three years, with mortality improvements projected by Scale AA to 2008 (adopted July 1, 2006). For Females: RP 2000 Disabled Mortality Table for Females, set forward three years, with mortality improvements projected by Scale AA to 2008 (adopted July 1, 2006).	Table A-5
	F.	Other terminations of employment (adopted May 13, 2010)	Table A-6
	G.	Probability of retaining membership in the System upon vested termination (adopted July 1, 2002)	Table A-7

* *Montana University System (MUS) members are assumed to have a 0.63% higher average final compensation to account for the larger than average annual compensation increases observed in the years immediately preceding retirement.*

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Table A-2

Future Salaries

Years of Service	General Members			University Members		
	Individual Merit & Longevity	General Wage Increase	Total Salary Increase	Individual Merit & Longevity	General Wage Increase	Total Salary Increase
1	4.51%	4.50%	9.01%	1.00%	4.50%	5.50%
2	4.09	4.50	8.59	1.00	4.50	5.50
3	3.46	4.50	7.96	1.00	4.50	5.50
4	2.94	4.50	7.44	1.00	4.50	5.50
5	2.52	4.50	7.02	1.00	4.50	5.50
6	2.21	4.50	6.71	1.00	4.50	5.50
7	1.89	4.50	6.39	1.00	4.50	5.50
8	1.68	4.50	6.18	1.00	4.50	5.50
9	1.47	4.50	5.97	1.00	4.50	5.50
10	1.31	4.50	5.81	1.00	4.50	5.50
11	1.16	4.50	5.66	1.00	4.50	5.50
12	1.00	4.50	5.50	1.00	4.50	5.50
13	0.84	4.50	5.34	1.00	4.50	5.50
14	0.68	4.50	5.18	1.00	4.50	5.50
15	0.58	4.50	5.08	1.00	4.50	5.50
16	0.47	4.50	4.97	1.00	4.50	5.50
17	0.37	4.50	4.87	1.00	4.50	5.50
18	0.26	4.50	4.76	1.00	4.50	5.50
19	0.21	4.50	4.71	1.00	4.50	5.50
20	0.16	4.50	4.66	1.00	4.50	5.50
21	0.11	4.50	4.61	1.00	4.50	5.50
22 & Up	0.00	4.50	4.50	1.00	4.50	5.50

Teachers' Retirement System
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Table A-3

Retirement
Annual Rates

	General Members			University Members		
Age	Eligible for Reduced Benefits	First Year Eligible for Full Benefits	Thereafter	Eligible for Reduced Benefits	First Year Eligible for Full Benefits	Thereafter
45		8.0%	5.5%		17.0%	8.0%
46		8.0	5.5		17.0	8.0
47		8.0	5.5		17.0	8.0
48		8.0	5.5		17.0	8.0
49	*	8.0	5.5	*	17.0	8.0
50	5.0%	8.0	5.5	7.0%	17.0	8.0
51	5.0	8.0	6.3	7.0	17.0	8.0
52	5.0	8.0	8.0	7.0	17.0	8.0
53	5.0	9.0	7.3	7.0	17.0	8.0
54	5.0	9.0	8.2	7.0	17.0	8.0
55	7.0	9.0	9.8	7.0	15.0	8.0
56	7.0	12.0	11.3	7.0	15.0	8.0
57	7.0	11.8	12.5	7.0	15.0	8.0
58	7.0	14.8	13.1	7.0	15.0	8.0
59	7.0	17.4	14.8	7.0	15.0	8.0
60	*	14.6	17.0	*	15.0	8.5
61		21.3	25.0		14.0	14.5
62		23.8	25.0		20.0	19.0
63		11.4	25.0		14.0	14.5
64		19.0	25.0		20.0	18.0
65		40.0	35.0		28.0	26.0
66		8.0	20.0		21.0	21.0
67		30.0	20.0		21.0	24.5
68		6.0	20.0		21.0	19.5
69		6.0	20.0		21.0	30.0
70		**	**		**	**

* *All benefits are unreduced after attaining age 60. Reduced benefits are not available before age 50.*
** *Immediate retirement is assumed at age 70 or over.*

Teachers' Retirement System
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Table A-4

Disablement
Annual Rates

Age	All Members
25	.005%
30	.005
35	.008
40	.028
45	.044
50	.063
55	.084
60	.100

Teachers' Retirement System
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Table A-5

Mortality
Annual Rates

	Contributing Members, Service Retired Members and Beneficiaries		Disabled Members	
Age	Men	Women	Men	Women
25	.03%	.02%	1.97%	.68%
30	.04	.02	2.17	.69
35	.05	.04	2.17	.67
40	.09	.05	2.17	.66
45	.11	.08	2.08	.85
50	.15	.12	2.23	1.31
55	.23	.20	2.69	1.89
60	.41	.38	3.32	2.43
65	.78	.73	3.99	3.19
70	1.45	1.29	4.90	4.33
75	2.42	2.17	6.15	6.01
80	4.22	3.55	8.30	8.30
85	7.55	5.91	11.43	11.86

Teachers' Retirement System
State of Montana

Table A-6

Other Terminations of Employment
Among Members Not Eligible to Retire
Annual Rates

Years of Service	All Members
1	36.5%
2	20.5
3	14.6
4	10.5
5	8.5
6	7.0
7	6.4
8	5.8
9	5.4
10	5.0
11	4.3
12	3.9
13	3.5
14	3.2
15	2.9
16	2.6
17	2.3
18	2.0
19	1.9
20	1.8
21	1.7
22	1.6
23	1.5
24	1.5

Teachers' Retirement System
State of Montana

Table A-7

Probability of Retaining Membership in the System Upon Vested Termination

Age	Probability of Retaining Membership
25	54%
30	54
35	58
40	58
45	60
50	70
55	75

Teachers' Retirement System
State of Montana

Appendix B

Summary of Benefit Provisions

Effective Date	September 1, 1937.
Vesting Period	Five years. No benefits are payable unless the member has a vested right, except the return of employee contributions with interest.
Final Compensation	Average of highest three consecutive years of earned compensation.
Normal Form of Benefits	Life only annuity. All benefits cease upon death; however, in no event will the member receive less than the amount of employee contributions with interest.
Normal Retirement Benefits	
Eligibility:	25 years of service or age 60 and five years of service.
Benefit:	The retirement benefit is equal to 1/60 of final compensation for each year of service.
Early Retirement Benefits	
Eligibility:	Five years of service and age 50.
Benefit:	The retirement benefit is calculated in the same manner as described for normal retirement, but the benefit is reduced 1/2 of 1% for each of the first 60 months early and 3/10 of 1% for each of the next 60 months early.

Death Benefit	
Eligibility:	Five years of service.
Benefit:	The death benefit is equal to 1/60 of final compensation for each year of service accrued at date of death, with an actuarial adjustment based on the relation of the member's age at death to the beneficiary's age. A monthly benefit of $200 is paid to each child until age 18. In addition, a lump-sum benefit of $500 is paid upon the death of an active or retired member.
Disability Benefit	
Eligibility:	Five years of service.
Benefit:	The disability benefit is equal to 1/60 of final compensation for each year of service accrued at date of disability. The minimum benefit is 1/4 of the final compensation.
Withdrawal Benefits	With less than five years of service, the accumulated employee contributions with interest are returned. With more than five years, the member may elect a refund of contributions with interest or leave the contributions and interest in the System and retain a vested right to retirement benefits.
Contributions	Member: 7.15% of compensation. Employer: 9.96% of compensation. MCA 19-20-604 specifies that the employer contribution rate will be reduced by 0.11% when the amortization period of the System's UAAL is 10 years or less according to the System's latest actuarial valuation.
Interest on Member contributions	Effective July 1, 2010, the interest credited on member contributions is reduce from 1.0% to 0.25% per annum.
Cost-of-Living Adjustments	On January 1 of each year, the retirement allowance payable must be increased by 1.5% if the retiree has received benefits for at least 36 months prior to January 1 of the year in which the adjustment is to be made.

Teachers' Retirement System
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Appendix C

Valuation Data

This valuation is based upon the membership of the System as of July 1, 2011. Membership data were supplied by the System and accepted for valuation purposes without audit. However, tests were performed to ensure that the data are sufficiently accurate for valuation purposes.

Active Members	Number	Annual Salaries in Millions
Full-Time Members	12,506	$ 633.0
Part-Time Members*	5,400	73.3
Total Contributing Members*	17,906	$ 706.3
Active Members with Annual Compensation less than $1,000	578	
Total Active Members	18,484	

** Excludes part-time members with annual compensation less than $1,000.*

Table C-1 contains summaries of the data for contributing members. For full-time members, values shown in the tables are the numbers of members and their total and average annual salaries. For part-time members, only the numbers of members are shown.

Table C-2 presents distributions of the following:

- Members receiving service retirement benefits.
- Members receiving disability retirement benefits.
- Survivors of deceased retired members receiving benefits.
- Survivors of deceased active members.
- Child beneficiaries.
- Terminated vested members.

Table C-3 is a reconciliation of membership data from July 1, 2010 to July 1, 2011.

The following is a summary of retired members and beneficiaries currently receiving benefits:

Type of Annuitant	Number	Annual Benefits in Thousands	Average Annual Benefits
Service Retirement	11,250	$ 231,385	$ 20,568
Survivors of Deceased Retired Members	997	12,999	13,039
Total Service Retirement (including survivors	12,247	$ 244,385	$ 19,955
Disability Retirement	207	2,099	10,140
Survivors of Deceased Active Members	414	3,942	9,522
Child Beneficiaries	31	74	2,406
Total Annuitants	12,899	$ 250,500	$ 19,420

Terminated Members with Contributions Not Withdrawn	Number
Vested Terminated Members	1,580
Non-Vested Terminated Members	10,727
Total Terminated Members	12,307

Teachers' Retirement System
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Table C-1

Active Members Distribution of Full-Time Employees and Salaries
as of July 1, 2011

Number of Employees

	Completed Years of Service												
Age	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+	Totals
<25	21	120	25	1	1	-	-	-	-	-	-	-	168
25 to 29	22	215	206	393	238	-	-	-	-	-	-	-	1,074
30 to 34	14	111	129	281	714	161	-	-	-	-	-	-	1,410
35 to 39	6	62	66	191	431	548	118	-	-	-	-	-	1,422
40 to 44	10	58	49	148	284	394	522	121	-	-	-	-	1,586
45 to 49	8	28	37	99	239	280	348	425	154	-	-	-	1,618
50 to 54	3	24	29	82	215	268	294	345	468	158	-	-	1,886
55 to 59	2	31	15	53	143	204	271	330	328	421	144	-	1,942
60 to 64	4	11	13	25	86	105	121	213	183	168	201	42	1,172
65 to 69	1	2	5	4	15	19	16	28	33	23	19	22	187
70 and up	1	-	1	4	2	-	4	5	6	1	3	14	41
Totals	92	662	575	1,281	2,368	1,979	1,694	1,467	1,172	771	367	78	12,506

Teachers' Retirement System
State of Montana

Table C-1

Active Members Distribution of Full-Time Employees and Salaries

as of July 1, 2011

Annual Salaries in Thousands

	Completed Years of Service												
Age	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+	Totals
<25	487	3,638	831	34	39	-	-	-	-	-	-	-	5,029
25 to 29	416	6,908	6,847	13,751	9,147	-	-	-	-	-	-	-	37,069
30 to 34	275	3,818	4,624	10,716	29,947	7,417	-	-	-	-	-	-	56,797
35 to 39	160	2,223	2,515	7,662	19,059	27,545	6,439	-	-	-	-	-	65,602
40 to 44	253	2,174	1,817	6,217	12,982	20,134	29,535	7,270	-	-	-	-	80,381
45 to 49	210	1,027	1,432	3,881	10,547	14,389	19,810	25,460	9,298	-	-	-	86,054
50 to 54	273	1,122	1,128	3,442	9,842	12,979	16,355	20,549	28,387	10,028	-	-	104,104
55 to 59	34	1,448	775	2,449	6,645	10,555	15,348	19,534	20,154	26,694	8,993	-	112,630
60 to 64	221	482	671	1,249	4,063	5,422	6,644	12,558	11,510	11,293	13,366	2,894	70,373
65 to 69	340	54	332	148	756	1,149	893	1,673	2,218	1,652	1,630	1,524	12,368
70 and up	14	-	56	178	67	-	224	320	401	65	220	1,052	2,597
Totals	2,683	22,894	21,028	49,727	103,095	99,589	95,247	87,363	71,968	49,732	24,209	5,469	633,005

Teachers' Retirement System
State of Montana

Table C-1

Active Members Distribution of Full-Time Employees and Salaries
as of July 1, 2011

Average Annual Salary

	Completed Years of Service												
Age	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+	Totals
<25	23,187	30,317	33,243	33,988	39,444	-	-	-	-	-	-	-	29,937
25 to 29	18,930	32,131	33,238	34,989	38,434	-	-	-	-	-	-	-	34,515
30 to 34	19,637	34,394	35,844	38,136	41,943	46,070	-	-	-	-	-	-	40,282
35 to 39	26,634	35,857	38,112	40,115	44,220	50,264	54,564	-	-	-	-	-	46,134
40 to 44	25,279	37,482	37,080	42,004	45,712	51,101	56,580	60,085	-	-	-	-	50,682
45 to 49	26,298	36,685	38,690	39,203	44,131	51,388	56,925	59,906	60,374	-	-	-	53,185
50 to 54	91,037	46,741	38,901	41,976	45,775	48,429	55,629	59,562	60,656	63,466	-	-	55,199
55 to 59	17,036	46,702	51,669	46,213	46,469	51,739	56,636	59,193	61,446	63,406	62,451	-	57,997
60 to 64	55,354	43,822	51,582	49,971	47,241	51,635	54,913	58,956	62,898	67,219	66,499	68,897	60,045
65 to 69	339,794	27,135	66,455	36,880	50,413	60,495	55,786	59,745	67,197	71,828	85,793	69,255	66,140
70 and up	13,750	-	56,100	44,564	33,351	-	55,878	63,992	66,880	65,499	73,236	75,158	63,341
Totals	29,168	34,583	36,570	38,819	43,537	12,233	56,226	59,552	61,406	64,503	65,965	70,122	50,616

Teachers' Retirement System
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Table C-1

Active Members Distribution of Part-Time Employees

as of July 1, 2011

Number of Employees

	Completed Years of Service												
Age	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+	Totals
<25	148	54	21	8	2	-	-	-	-	-	-	-	233
25 to 29	199	146	80	74	36	8	4	-	-	-	-	-	547
30 to 34	92	73	55	78	82	24	5	5	1	-	-	-	415
35 to 39	102	94	68	100	85	54	24	2	2	-	2	-	533
40 to 44	104	97	72	106	129	51	26	10	5	1	1	4	606
45 to 49	58	69	82	116	195	107	34	14	12	6	3	12	708
50 to 54	55	64	57	114	219	140	98	31	17	6	3	12	816
55 to 59	48	41	57	92	178	147	108	42	31	10	6	9	769
60 to 64	38	36	29	53	108	78	79	49	14	4	8	10	506
65 to 69	10	15	19	24	44	28	20	12	2	2	2	1	179
70 and up	9	4	8	11	22	17	7	6	1	2	1	-	88
Totals	863	693	548	776	1,100	654	405	171	85	31	26	48	5,400

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State of Montana

Table C-2

Distribution of Inactive Lives

Members Receiving Service Retirement Benefits as of July 1, 2011

Age	Number of Persons	Annual Benefits in Thousands	Average Annual Benefits
<50	14	$ 340	$ 24,290
50 to 54	219	4,737	21,630
55 to 59	944	21,137	22,390
60 to 64	2,624	59,580	22,706
65 to 69	2,587	57,537	22,241
70 to 74	1,829	38,984	21,314
75 to 79	1,311	25,359	19,343
80 to 84	837	13,245	15,824
85 to 89	497	6,679	13,439
90 and up	388	3,788	9,763
Totals	11,250	$ 231,385	$ 20,568

Members Receiving Disability Retirement Benefits as of July 1, 2011

Age	Number of Persons	Annual Benefits in Thousands	Average Annual Benefits
<50	14	$ 160	$ 11,434
50 to 54	12	138	11,529
55 to 59	32	341	10,645
60 to 64	49	480	9,786
65 to 69	36	402	11,155
70 to 74	24	237	9,881
75 to 79	14	124	8,822
80 to 84	15	140	9,302
85 to 89	5	31	6,275
90 and up	6	47	7,877
Totals	207	$ 2,099	$ 10,140

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Table C-2

Distribution of Inactive Lives

Survivors of Deceased Retired Members as of July 1, 2011

Age	Number of Persons	Annual Benefits in Thousands	Average Annual Benefits
<50	49	$ 367	$ 7,496
50 to 54	20	187	9,352
55 to 59	41	450	10,969
60 to 64	88	1,170	13,294
65 to 69	134	2,060	15,373
70 to 74	137	2,139	15,613
75 to 79	153	2,372	15,506
80 to 84	145	1,948	13,433
85 to 89	139	1,505	10,824
90 and up	91	802	8,810
Totals	997	$ 12,999	$ 13,039

Survivors of Deceased Active Members as of July 1, 2011

Age	Number of Persons	Annual Benefits in Thousands	Average Annual Benefits
<50	78	$ 524	$ 6,713
50 to 54	37	250	6,765
55 to 59	36	280	7,774
60 to 64	74	794	10,735
65 to 69	49	643	13,123
70 to 74	44	501	11,386
75 to 79	30	259	8,625
80 to 84	37	440	11,901
85 to 89	17	202	11,870
90 and up	12	49	4,095
Totals	414	$ 3,942	$ 9,522

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Table C-2

Distribution of Inactive Lives

Terminated Vested Members as of July 1, 2011
Number of Persons

Age	Number
<25	-
25 to 29	7
30 to 34	76
35 to 39	165
40 to 44	197
45 to 49	257
50 to 54	331
55 to 59	380
60 to 64	140
65 to 69	23
70 and above	4
Total	1,580

Child Beneficiaries as of July 1, 2011
Number of Persons

Age	Number
<5	-
5 to 6	1
7 to 8	2
9 to 10	4
11 to 12	7
13 to 14	9
15 to 16	6
17 to 18	2
Total	31

Teachers' Retirement System
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Table C-3

Data Reconciliation

	Active Contributing Members*	Terminated Vested Members	Service Retired Members	Disabled Members	Survivors and Beneficiaries
July 1, 2010 Valuation	18,353	1,553	10,834	215	1,391
Refunds and Non-Vested Terminations	(1,266)	(50)			
Change to Annual Pay Under $1,000	7	7	2		
Vested Terminations	(231)	231			
Service Retirements	(582)	(80)	664		
Disability Retirements	(8)			8	
Deaths with Beneficiary	(15)	(2)	(70)	(7)	115
Deaths without Beneficiary	(2)		(176)	(9)	(60)
New Entrants	1,286				
Rehires	359	(77)	(3)		
Other	5	(2)	(1)		(4)
July 1, 2011 Valuation	17,906	1,580	11,250	207	1,442

* Excludes active members with annual compensation less than $1,000

Teachers' Retirement System
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Appendix D

Comparative Schedules

This section contains tables that summarize the experience of the System shown in present and past valuation reports.

Table D-1 shows a summary of the active members covered as of the various valuation dates.

Table D-2 shows a summary of the retired and inactive members as of the various valuation dates.

Table D-3 summarizes the contribution rates determined by each annual actuarial valuation.

Teachers' Retirement System
State of Montana

Table D-1

Active Membership Data

Valuation Date (July 1)	Active Members: Full-Time Members	Part-Time Members**	Total Contributing Members**	Part-Time Members Annual Compensation less than $1,000	Annual Full-Time Salaries in Thousands	Average Full-Time Annual Salary	Average Age**	Average Years of Service**	Average Hire Age**
1987	13,105	1,955	15,060	*	$340,481	$25,981	*	*	*
1989	12,546	2,541	15,087	*	339,866	27,090	*	*	*
1992	13,502	3,141	16,643	*	401,092	29,706	42.4	11.6	30.8
1994	14,938	2,637	17,575	377	416,968	27,914	42.5	11.0	31.5
1996	13,251	5,444	18,695	1,295	424,085	32,004	43.3	11.6	31.7
1998	13,545	4,647	18,192	776	459,191	33,901	44.0	12.1	31.9
2000	13,289	4,245	17,534	886	477,160	35,906	44.5	12.2	32.3
2002	12,796	4,650	17,446	723	486,204	37,997	45.0	12.2	32.8
2004	12,601	5,013	17,614	637	510,808	40,537	45.6	12.2	33.4
2005	12,523	5,019	17,542	697	523,909	41,836	45.8	12.4	33.4
2006	12,715	4,840	17,555	544	549,268	43,198	46.0	12.5	33.5
2007	12,634	4,994	17,628	548	568,351	44,986	46.2	12.5	33.7
2008	12,694	5,077	17,771	521	592,514	46,677	46.1	12.3	33.8
2009	12,673	5,270	17,943	513	613,077	48,377	46.2	12.4	33.8
2010	12,711	5,642	18,353	600	630,444	49,598	45.9	12.2	33.8
2011	12,506	5,400	17,906	578	633,005	50,616	46.2	12.4	33.8

* *Not available.*

** *Excludes part-time active members with annual compensation less than $1,000.*

Teachers' Retirement System
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Table D-2

Retired and Inactive Membership Data

	All Annuitants					Terminated Members	
Valuation Date (July 1)	Number	Annual Benefits in Thousands	Average Annual Benefit	Average Current Age	Average Age at Retirement	Number Vested Terminated	Number Non-Vested Terminated
1987	6,036	$ 43,236	$ 7,163	*	*	*	*
1989	6,330	49,546	7,827	*	*	*	*
1992	6,927	63,483	9,165	*	*	*	*
1994	7,530	78,183	10,383	*	*	1,105	5,722
1996	7,896	87,351	11,063	*	*	1,152	6,479
1998	8,362	99,040	11,844	69.6	57.3	1,190	8,158
2000	9,021	117,227	12,995	69.3	57.0	1,256	9,308
2002	9,768	139,131	14,244	69.1	56.8	1,485	8,231
2004	10,375	159,776	15,400	69.1	56.7	1,620	7,861
2005	10,664	170,129	15,954	69.3	56.7	1,649	8,569
2006	11,019	181,114	16,436	69.3	56.5	1,684	8,542
2007	11,356	195,237	17,192	69.3	56.6	1,671	8,963
2008	11,788	208,985	17,729	69.4	56.7	1,649	9,574
2009	12,036	219,267	18,218	69.7	57.5	1,640	9,868
2010	12,440	234,048	18,814	69.9	57.6	1,553	10,304
2011	12,899	250,500	19,420	70.0	57.8	1,580	10,727

* *Not available.*

Teachers' Retirement System
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Table D-3

Contribution Rates

Valuation Date	Contribution Rates			Normal	UAAL
(July 1)	Employee	Employer	Total	Cost Rate	Rate*
1992	7.044%	7.459%	14.503%	9.876%	4.627%
1994	7.044	7.470	14.514	9.494	5.020
1996	7.044	7.470	14.514	9.328	5.186
1998	7.044	7.470	14.514	8.880	5.634
2000	7.15	7.58**	14.73	9.71	5.02
2002	7.15	7.58	14.73	10.33	4.40
2004	7.15	7.58	14.73	10.34	4.39
2005	7.15	7.58	14.73	10.35	4.38
2006	7.15	7.58	14.73	10.37	4.36
2007	7.15	9.58	16.73	10.40	6.33
2008	7.15	9.58	16.73	10.87	5.86
2009	7.15	9.96	17.11	10.69	6.42
2010	7.15	9.96	17.11	9.74	7.37
2011	7.15	9.96	17.11	9.64	7.47

* *The UAAL rate is the amount available to amortize the UAAL. It is equal to the total contribution rate, minus the normal cost rate.*
** *The 1999 Legislation which passed the 1.5% GABA, also added a 0.11% state general fund contribution.*

Teachers' Retirement System
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Appendix E

Glossary

The following definitions are largely excerpts from a list adopted in 1981 by the major actuarial organizations in the United States. In some cases the definitions have been modified for specific applicability to the Montana Teachers' Retirement System. Defined terms are capitalized throughout this Appendix.

Accrued Benefit

The amount of an individual's benefit (whether or not vested) as of a specific date, determined in accordance with the terms of a pension plan and based on compensation and service to that date.

Actuarial Accrued Liability

That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of pension plan benefits and expenses which is not provided for by future Normal Costs.

Actuarial Assumptions

Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, withdrawal, disablement, and retirement; changes in compensation, rates of investment earnings, and asset appreciation or depreciation; procedures used to determine the Actuarial Value of Assets; and other relevant items.

Actuarial Cost Method

A procedure for determining the Actuarial Present Value of pension plan benefits and expenses and for developing an actuarially equivalent allocation of such value to time periods, usually in the form of a Normal Cost and an Actuarial Accrued Liability.

Actuarial Gain (Loss)

A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions during the period between two Actuarial Valuation dates, as determined in accordance with a particular Actuarial Cost Method.

Actuarial Present Value

The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions.

Actuarial Valuation

The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a pension plan.

Actuarial Value of Assets

The value of cash, investments and other property belonging to a pension plan, as used by the actuary for the purpose of an Actuarial Valuation.

Actuarially Equivalent

Of equal Actuarial Present Value, determined as of a given date with each value based on the same set of Actuarial Assumptions.

Amortization Payment

That portion of the pension plan contribution which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Entry Age Actuarial Cost Method

A method under which the Actuarial Present Value of the Projected Benefits of each individual included in an Actuarial Valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages. The portion of this Actuarial Present Value allocated to a valuation year is called the Normal Cost. The portion of this Actuarial Present Value not provided for at a valuation date by the Actuarial Present Value of future Normal Costs is called the Actuarial Accrued Liability.

Market Value of Assets

The fair value of cash, investments and other property belonging to a pension plan that could be acquired by exchanging them on the open market.

Normal Cost

That portion of the Actuarial Present Value of pension plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Method.

Projected Benefits

Those pension plan benefit amounts which are expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age and past and anticipated future compensation and service credits.

Unaccrued Benefit

The excess of an individual's Projected Benefits over the Accrued Benefits as of a specified date.

Unfunded Actuarial Accrued Liability

The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets.